

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) Apparatus ~~(10)~~ for establishing the positions of metal objects in a mixed input stream of both metal and non-metal objects, the apparatus comprising a differential metal-detecting coil ~~(14A)~~ having a first coil portion ~~(15)~~ wound in a first sense and a second coil portion ~~(16)~~ of generally similar shape and size to the first, wound in a second sense opposite to the first sense, and conveying means ~~(11)~~ for moving objects with respect to, and past, the differential metal-detecting coil in a plane and in a direction with unit vector \hat{a} , characterised in that the second coil portion is displaced from the first coil portion by a displacement \mathbf{B} having a component in the plane in a direction with unit vector \hat{b} , wherein $0 < \cos^{-1} \hat{a} \cdot \hat{b} < \pi/2$, and in that the apparatus further comprises analysing means ~~(100)~~ a signal processor for analysing the form of the output voltage of the coil as a function of time to establish the position of said metal objects in a direction \hat{c} in the plane, where \hat{c} is defined by $\hat{a} \cdot \hat{c} = 0$.

2. (Original) Apparatus according to claim 1 wherein $\mathbf{B} \cdot \hat{a} \geq t$, where t is the dimension of a coil portion in the \hat{a} direction, and $\frac{s}{2} \leq \mathbf{B} \cdot \hat{c} \leq s$, where s is the dimension of a coil portion in a direction with unit vector \hat{c} defined by $\hat{a} \cdot \hat{c} = 0$.

3. (Currently Amended) Apparatus according to claim 1 ~~or claim 2~~ wherein the ~~analysing means signal processor comprises means for~~ is arranged to identifying distinguish voltages of different polarities, and ~~for~~ ascribing associate voltages of a first polarity ~~to~~ with one coil portion and voltages of a second polarity, opposite to the first, ~~to~~ with the other coil portion.

4. (Currently Amended) Apparatus according to ~~any preceding claim 1~~ and comprising a plurality of differential metal-detecting coils arranged in a linear array substantially in the \hat{c} direction.

5. (Currently Amended) Apparatus according to claim 4 and further comprising a single transmitter coil ~~(13)~~ arranged around the differential metal-detecting coils.

6. (Currently Amended) Apparatus according to claims 4 wherein the differential metal-detecting coils are each formed on a printed circuit board (PCB).

7. (Original) Apparatus according to claim 6 wherein the differential metal-detecting coils are formed on a single PCB.

8. (Original) Apparatus according to claim 7 wherein a single transmitter coil is formed on the PCB around the differential metal-detecting coils.

9. (Currently Amended) Apparatus according to claim 8 wherein the ~~analysing means~~ signal processor comprises electronic hardware co-located with said coils on the single PCB.

Claims 10-12 (Cancelled)

13. (Currently Amended) A method of establishing the positions of metal objects in a mixed input stream of both metal and non-metal objects, characterised in that the method comprises use of apparatus according to ~~any preceding claim~~ 1.

14. (Currently Amended) A metal-detector array system comprising a plurality of differential metal-detecting coils, the array extending in a direction with unit vector \hat{x} , and each metal-detecting coil having a first coil portion ~~(15)~~ wound in a first sense and a second coil portion ~~(16)~~ of generally similar shape and size to the first, wound in a second sense opposite to the first sense, characterised in that, in at least one metal-detecting coil, the second coil portion thereof is displaced from the first coil portion thereof by a displacement \mathbf{B} such that the two coil portions are substantially in the same plane and $0 < \cos^{-1} \hat{\mathbf{b}} \cdot \hat{\mathbf{x}} < \pi/2$ where $\hat{\mathbf{b}}$ is a unit vector defined by $\mathbf{B} \cdot \hat{\mathbf{b}} = |\mathbf{B}|$, and in that the system further comprises, in respect of that or those metal-detecting coil or coils, ~~analysing means~~ a signal processor for analysing the form of the output voltage of the coil or coils as a function of time to establish the position, along the direction \hat{x} , of metal

objects when said objects are moving past the array substantially in a direction with unit vector \hat{y} where $\hat{x} \bullet \hat{y} = 0$.